

**FINAL  
ENVIRONMENTAL REPORT 304M**

**PRE-MINING LAND USE  
OTTER CREEK MINE  
POWDER RIVER COUNTY, MONTANA**

Prepared for:

Otter Creek Coal, LLC  
401 N. 31<sup>st</sup> Street, Suite 770  
Billings, Montana 59101

Prepared by:

Ken Scow  
WESTECH Environmental Services, Inc.  
P.O. Box 6045  
Helena, Montana 59604

July 2014

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## LAND USE SUMMARY

### 1.0 LAND USE CLASSIFICATION

Mr. John Marks, the Powder River County Planner, was contacted (June 2012) regarding land use classification of the Otter Creek Coal Project Area and adjacent lands. Mr. Marks stated that there is no governmental zoning classification for the Project Area, neither municipal nor county. However, the Montana Department of Revenue classifies the Project Area as agriculture and grazing. The Department of Revenue classifies lands adjacent to the Project Area as agriculture and private timber. Mr. Marks said the county does not currently have plans to change the land use classification of the Project Area or adjacent lands.

### 2.0 UTILITY

The primary land uses in the Otter Creek Project Area (Tract 2 and Facilities Area combined) are livestock grazing (rangeland and pastureland) and hay production (hay cropland) (see Plate 1). NRCS technical guides (2003 and 2012) present recommended stocking rates for the applicable ecological sites in Powder River County, relative to current condition. Additionally, NRCS (2012) gives long-term irrigated and nonirrigated hay yields by soils mapping unit that can be expected under a high level of management. Information pertinent to the Otter Creek Project Area is summarized below.

#### 2.1 RANGE ANALYSIS

The predominant land use in the Project Area is cattle grazing (rangeland or grazing land), with essentially all native plant communities (7585 acres or 82 percent of the Project Area) being used for this purpose. Additionally, grazing land includes 830 acres of go-back tame pasture (about 9 percent of the Project Area), land that is seldom mowed for hay but more commonly is grazed the same as native rangeland. Calculations of recommended stocking rates were derived from NRCS (2003) technical guides. Condition of the various ecological sites, as determined from 2011-2012 baseline vegetation sampling, ranged from poor to low-excellent. These data can be used to assist in reclamation planning and evaluation of revegetation success.

The dominant ecological sites Project Area-wide were silty, shallow, shallow clay, clayey and very shallow, collectively comprising 85 percent of native grazing land in the Project Area. Among these five prevalent ecological sites, recommended stocking rates derived from technical guides (NRCS 2003) ranged from .12 to .37 AUM per acre in the very shallow site and silty site, respectively. Stocking rates for the five dominant ecological sites, weighted by acreage, constitute 82 percent of the total 2,155 AUMs grazing capacity estimated for the Project Area as a whole. This figure is a composite, and does not distinguish differing grazing capacities among livestock operations within the Project Area which reflect various historical management strategies in association with differing soils and ecological sites. The composite estimate of 2,155 AUMs also does not adjust for site grazability factors, such as steep slopes, site inaccessibility, or distance to water. [Overall, the recommended stocking rate based on total rangeland acreage, ecological sites present and range condition is 0.30 AUM per acre.](#)

## 2.2 CROPLAND PRODUCTIVITY

Hay is the only crop grown in the Otter Creek Project Area; hay fields are typically dominated by introduced pasture grasses, with alfalfa variable among fields. Dominant hay species are *Agropyron cristatum* (crested wheatgrass), *Bromus inermis* (smooth brome), *Medicago sativa* (alfalfa) and quackgrass (*Agropyron repens*). For purposes of this discussion, the term “Hay Cropland” or “Farmed Tame Pasture” includes areas predominantly vegetated by these introduced hay species. The term “farmed” is defined as tame pasture areas where plant production is managed accordingly, *i.e.*, in most years mowed, baled and stored as hay for livestock feed. “Pastureland” refers to tame pasture areas not managed *i.e.*, unfarmed, or generally not mowed but grazed later in the season following harvest of adjacent farmed areas, and includes go-back fields.

Some hay cropland areas have a naturally enhanced soil moisture regime, to varying extent resulting from irregular seasonal inundation from snow melt and/or spring rainfall, a high water table, or both. There are no developed irrigation systems other than spreader dikes in some areas to detain and infiltrate spring runoff. Neither flood irrigation by diversion of stream flow nor sprinkler irrigation is practiced during the growing season. Hence, there is no artificial application of water during the growing season in and adjacent to the floodplains of Otter Creek and three of its major tributaries - Home Creek, Threemile Creek and Tenmile Creek - in the vicinity of the Otter Creek coal tracts. For purposes of this discussion, “naturally moisture-enhanced” hay cropland is distinguished from “dryland” pastureland.

Tame Pasture occupies 1585 acres or 17 percent of the baseline study area, comprised of two categories (Table 2). These include 755 acres of farmed Hay Cropland which is developed and managed for hay production. An additional 830 acres of mostly dryland pastureland represents “go-back” tame pasture fields generally found in the upslope vicinity of the developed floodplain and low terrace pastures.

Based on compilation of long-term annual production data, the NRCS (2012) has determined representative values for total irrigated and non-irrigated hay production for pertinent soils in the Project Area (Table 2). The Hay Cropland type can be expected to produce, on average, 3 to 6 irrigated tons per acre and 1 to 2 non-irrigated tons per acre, depending on the soil and crop grown. Based on USDA Farm Service Agency (FSA) data provided by local ranchers, typical grass hay yields in the Otter Creek valley in the project area are about 1.5 tons per acre. This typical yield is commensurate with the non-irrigated yields for those soils for which NRCS-predicted yield data are available.

## 2.3 TIMBER PRODUCTIVITY

Timbered areas in the Project Area do not constitute a commercial timber resource. Much of forest and savannah tree density in the study area is composed of non-commercial Rocky Mountain juniper, and sapling to pole-size ponderosa pine (refer to Baseline Report 304J).

### 3.0 REFERENCES CITED

Natural Resources Conservation Service (NRCS). 2003.  
*Ecological Site Descriptions (Technical Guides) for Major Land Resource Area 58A-Northern Rolling High Plains, North Part, Montana.* USDA NRCS, June, 2003.

Natural Resources Conservation Service (NRCS). 2012.  
*Soil Survey Geographic (SSURGO) Database for Powder River Area, Montana.* Available online at <http://efotg.sc.egov.usda.gov/treemenu.aspx>. Accessed April 2012.

### 4.0 TABLES

Table 1 Rangeland Grazing Capacity of the Otter Creek Mine Project Area, Powder River County, Montana, 2011-2012.

Table 2 Predicted Average Yields of Principal Crops, Otter Creek Mine Project Area.

**Table 1**

**Rangeland Grazing Capacity of the Otter Creek Mine Project Area,  
Powder River County, Montana, 2011-2012.**

<b>Ecological Site<sup>1</sup></b>	<b>Acreage<sup>1</sup></b>	<b>Estimated Grazing Capacity (AUM)<sup>2</sup></b>
Clayey	628.6	220.0
Silty	2219.3	821.1
Silty Steep	141.6	41.1
Shallow	1797.3	359.5
Shallow Clay	1370.1	315.1
Dense Clay	46.8	7.0
Sandy	112.4	46.1
Sandy Steep	281.5	78.8
Very Shallow	442.6	53.1
Saline Lowland	216.5	86.6
Saline Upland	26.9	4.8
Overflow	250.9	82.8
Subirrigated	25.3	12.9
Wet Meadow	25.3	26.3
<b>TOTAL</b>	<b>7585</b>	<b>2155</b>

<sup>1</sup>See Plate 2 of the Baseline Report 304J (total acreage excludes Tame Pasture and miscellaneous disturbance).

<sup>2</sup>Following NRCS (2003): "AUM calculations are based on 790 pounds per animal unit month (AUM) for a 1,000 pound cow with calf up to 4 months. No adjustments have been made for site grazability factors, such as steep slopes, site inaccessibility, or distance to water."

**Table 2**  
**Expected Average Yields of Principal Crops, Otter Creek Mine Project Area.**

Soil Name (Baker 2012)	Land Capability <sup>1</sup>		Tame Pasture Acreage by Soil Series		Tame Pasture Expected Yield <sup>2</sup> (Tons per Acre)			
	Non-Irrigated	Irrigated	Hay Cropland (Acres)	Pastureland (Acres)	Grass Hay		Alfalfa Hay	
					Non-Irrigated	Irrigated	Non-Irrigated	Irrigated
Blacksheep-Cabba-Cabbart	7e	-	-	15.28	-	-	-	-
Farland	3e	3e	4.04	9.78	1.8	5	2	5.5
Fort Collins	3e	3e	5.60	55.98	1	-	-	-
Haverson	3e	3e	22.51	65.28	1.5	3	1.8	7
Haverson-Saline	4e	4e	300.14	26.80	-	-	-	-
Havre	4e	4e	-	-	1	-	-	-
Heldt	3e	3e	156.94	56.60	1.2	3	1	5
Heldt-Saline	4e	4e	131.62	47.59	-	-	-	-
Hydro	3e	3e	3.78	13.61	0.8	-	0.8	4
McRae	3e	2e	101.18	206.53	-	-	1.5	5.5
McRae-Saline	4e	4e	-	87.26	-	-	-	-
Midway-Cabbart	4e	4e	0.10	26.48	-	-	-	-
Midway-Delpoint	4e	4e	-	7.72	-	-	-	-
Nihill-Havre	6e	6e	3.65	23.32	-	-	-	-
Relan	4e	4e	2.31	69.86	-	-	1.5	-
Ringling	7e	-	5.74	61.81	-	-	-	-
Ringling-Twilight	4e	4e	-	-	-	-	-	-
Ringling-Twilight-Barvon	7e	-	-	29.08	-	-	-	-
Saline Overflow	-	-	17.89	11.20	-	-	-	-
Twilight-Blacksheep	4e	4e	0.06	15.64	-	-	-	-
<b>Total Acres</b>			755.56	829.82				

<sup>1</sup>**Land capability** classification (NRCS 2012a,b) shows, in a general way, the suitability of soils for most kinds of field crops. Soils are generally grouped at three levels - capability class, subclass, and unit.

*Capability classes*, the broadest groups, are designated by the numbers 1 through 8, indicating progressively greater limitations and narrower choices for practical use. If properly managed, soils in classes 1, 2, 3 and 4 are suitable for the mechanized production of commonly grown field crops and for pasture.

*Capability subclasses* indicate the dominant limitations in the class by adding a letter, e, w, s, or c, to the class numeral. The letter e shows that the main hazard is the risk of erosion; w shows that water in or on the soil interferes with plant growth; s shows that the soil is limited mainly because it is shallow, droughty, or stony; and c shows that the chief limitation is climate that is very cold or very dry.

<sup>2</sup>**Source:** Powder River County Soil Survey (NRCS 2012a,b), where "absence of a yield figure indicates that the soil is not suitable for the crop or the crop is not generally grown on the soil".

**Definitions** specific to the Otter Creek Project Area:

Tame Pasture categories (generally patterned after ARM 17.24.301)

Hay Cropland – (farmed tame pasture, managed and regularly mowed)

Pastureland – (primarily "go-back" tame pasture, not managed and seldom mowed, but grazed)